IN THE CLAIMS

1. (original) An interconnect of an integrated circuit device, comprising:

a diffusion barrier layer;

a first metal layer on the diffusion barrier layer, wherein the first metal layer comprises a first metal component and a second metal component forming a crystalline compound with the first metal component, wherein the second metal component has a surface energy lower than a surface energy of the first metal component, and wherein the crystalline compound is rich in the first metal component; and

a second metal layer on the first metal layer, wherein the second metal layer comprises the first metal component.

2. (original) The interconnect of claim 1, wherein the diffusion barrier layer is a titanium-containing layer.

3. (original) The interconnect of claim 1, wherein the diffusion barrier layer is titanium nitride.

4. (original) The interconnect of claim 1, wherein the first metal component is selected from the group consisting of copper, silver, gold, palladium, platinum, rhenium, iridium, ruthenium and osmium.

5. (original) The interconnect of claim 1, wherein the second metal component is selected from the group consisting of scandium, yttrium, lanthanum, titanium, zirconium and hafnium.

6. (original) The interconnect of claim 1, wherein the first metal layer further comprises a third metal component forming a second crystalline compound with the first metal component, wherein the third metal component is different from the second metal component, wherein the third metal component has a surface energy lower than a surface energy of the first metal component, and wherein the second crystalline compound is rich in the first metal component.

7. (original) A portion of an integrated circuit device, comprising:

a dielectric layer overlying a base layer;

a layer of titanium nitride overlying the dielectric layer;

a first metal layer on the layer of titanium nitride, wherein the first metal layer comprises a crystalline alloy compound containing a first metal component and a second metal component, wherein the second metal component is selected from the group consisting of Group IIIA and Group IVA elements, and wherein an atomic ratio of the first metal component to the second metal component in the first metal layer is greater than one; and

a second metal layer on the first metal layer, wherein the second metal layer comprises the first metal component.

8. (original) The portion of an integrated circuit device of claim 7, wherein the atomic ratio of the first metal component to the second metal component in the first metal layer is greater than two.

9. (original) The portion of an integrated circuit device of claim 7, wherein the atomic ratio of the first metal component to the second metal component in the first metal layer is greater than ten.

10. (original) The portion of an integrated circuit device of claim 7, wherein the atomic ratio of the first metal component to the second metal component in the first metal layer is greater than twenty.

11. (original) The portion of an integrated circuit device of claim 7, wherein the layer of titanium nitride is adjoining a portion of the dielectric layer.

12. (original) The portion of an integrated circuit device of claim 11, wherein the layer of titanium nitride is further adjoining a portion of the base layer.

13. (original) The portion of an integrated circuit device of claim 7, wherein the base layer is selected from the group consisting of a semiconductor substrate and a conductor layer.

14. (original) An interconnect of an integrated circuit device, comprising:

a titanium nitride layer;

a first metal layer on the titanium nitride layer, wherein the first metal layer comprises copper and a metal component forming a crystalline compound with the copper, wherein the metal component is selected from the group consisting of scandium, yttrium, lanthanum, titanium, zirconium and hafnium, and wherein the crystalline compound has an atomic ratio of copper to the metal component in the first metal layer of greater than one; and

a second metal layer on the first metal layer, wherein the second metal layer comprises copper.

15. (original) A portion of an integrated circuit device, comprising:

a layer of titanium nitride adjoining a dielectric layer;

a metal layer on the layer of titanium nitride, wherein the metal layer comprises a copper-rich alloy selected from the group consisting of Cu_4Sc, Cu_6Y, Cu_4Ti, Cu_3Ti and Cu_5Zr; and

a copper layer on the metal layer.

16. (original) The portion of an integrated circuit device of claim 15, wherein the copper-rich alloy has a crystalline structure.

17. (original) The portion of an integrated circuit device of claim 15, wherein the metal layer further comprises elemental copper.

18. (original) The portion of an integrated circuit device of claim 17, wherein at least 25 wt% of the metal layer is the elemental copper.

19. (original) The portion of an integrated circuit device of claim 17, wherein at least 50 wt% of the metal layer is the elemental copper.

20. (original) The portion of an integrated circuit device of claim 15, wherein the layer of titanium nitride is further adjoining a base layer selected from the group consisting of a semiconductor substrate and a conductor layer.

21. (original) An interconnect of an integrated circuit device, comprising:

a layer of titanium nitride;

a first metal layer on the layer of titanium nitride, wherein the first metal layer comprises elemental copper, wherein the first metal layer further comprises a copper-rich crystalline alloy compound containing copper and a metal component selected

from the group consisting of scandium, yttrium, lanthanum, titanium, zirconium and hafnium, and wherein at least 25 wt% of the first metal layer is elemental copper; and

a second metal layer on the first metal layer, wherein the second metal layer comprises copper.

22. (original) An interconnect of an integrated circuit device, comprising:

a layer of titanium nitride;

a first metal layer on the layer of titanium nitride, wherein the first metal layer comprises elemental copper, wherein the first metal layer further comprises a copper-rich crystalline alloy compound containing copper and a metal component selected from the group consisting of scandium, yttrium, lanthanum, titanium, zirconium and hafnium, and wherein an atomic ratio of copper to the metal component in the first metal layer is greater than ten; and

a second metal layer on the first metal layer, wherein the second metal layer comprises copper.

23. (original) An interconnect of an integrated circuit device, comprising:

a titanium nitride layer;

a first metal layer on the titanium nitride layer, wherein the first metal layer comprises silver and a metal component forming a crystalline compound with the silver, wherein the metal component is selected from the group consisting of scandium, yttrium and lanthanum, and wherein the crystalline compound has an atomic ratio of silver to the metal component in the first metal layer of greater than one; and

a second metal layer on the first metal layer, wherein the second metal layer comprises silver.

24. (original) A portion of an integrated circuit device, comprising:

a layer of titanium nitride adjoining a dielectric layer;

a metal layer on the layer of titanium nitride, wherein the metal layer comprises a silver-rich alloy selected from the group consisting of Ag_4Sc and Ag_4Y; and

a silver layer on the metal layer.

25. (original) The portion of an integrated circuit device of claim 24, wherein the silver-rich alloy has a crystalline structure.

26. (original) The portion of an integrated circuit device of claim 24, wherein the metal layer further comprises elemental silver.

27. (original) The portion of an integrated circuit device of claim 26, wherein at least 25 wt% of the metal layer is the elemental silver.

28. (original) The portion of an integrated circuit device of claim 26, wherein at least 50 wt% of the metal layer is the elemental silver.

29. (original) The portion of an integrated circuit device of claim 24, wherein the layer of titanium nitride is further adjoining a base layer selected from the group consisting of a semiconductor substrate and a conductor layer.

30. (original) An interconnect of an integrated circuit device, comprising:

a layer of titanium nitride;

a first metal layer on the layer of titanium nitride, wherein the first metal layer comprises elemental silver, wherein the first metal layer further comprises a silver-rich

crystalline alloy compound containing silver and a metal component selected from the group consisting of scandium, yttrium and lanthanum, and wherein at least 25 wt% of the first metal layer is elemental silver; and

a second metal layer on the first metal layer, wherein the second metal layer comprises silver.

31. (original) An interconnect of an integrated circuit device, comprising:

a layer of titanium nitride;

a first metal layer on the layer of titanium nitride, wherein the first metal layer comprises elemental silver, wherein the first metal layer further comprises a silver-rich crystalline alloy compound containing silver and a metal component selected from the group consisting of scandium, yttrium and lanthanum, and wherein an atomic ratio of silver to the metal component in the first metal layer is greater than ten; and

a second metal layer on the first metal layer, wherein the second metal layer comprises silver.

32. (currently amended) An interconnect of an integrated circuit device, comprising:

a diffusion barrier layer;

a ~~nitrided metal~~ layer of a metal alloy nitride on the diffusion barrier layer, wherein the ~~nitrided metal~~ layer of metal alloy nitride comprises a first metal component, a second metal component ~~capable of~~ that can form~~ing~~ a crystalline compound with the first metal component, and nitrogen, wherein the second metal component has a surface energy lower than a surface energy of the first metal component, and wherein the nitrided metal layer is rich in the first metal component; and

a second metal layer on the ~~nitrided metal~~ layer of metal alloy nitride, wherein the second metal layer comprises the first metal component.

33. (original) The interconnect of claim 32, wherein the diffusion barrier layer is a titanium-containing layer.

34. (original) The interconnect of claim 32, wherein the diffusion barrier layer is titanium nitride.

35. (original) The interconnect of claim 32, wherein the first metal component is selected from the group consisting of copper, silver, gold, palladium, platinum, rhenium, iridium, ruthenium and osmium.

36. (original) The interconnect of claim 32, wherein the second metal component is selected from the group consisting of scandium, yttrium, lanthanum, titanium, zirconium and hafnium.

37. (original) An interconnect of an integrated circuit device, comprising:

a layer of titanium nitride;

a nitrided metal layer on the layer of titanium nitride, wherein the nitrided metal layer comprises a nitride metal alloy compound containing a first metal component, a second metal component and nitrogen, wherein the second metal component is selected from the group consisting of Group IIIA and Group IVA elements, and wherein an atomic ratio of the first metal component to the second metal component in the nitrided metal layer is greater than one; and

a metal layer on the nitrided metal layer, wherein the metal layer comprises the first metal component.

38. (original) The interconnect of claim 37, wherein the atomic ratio of the first metal component to the second metal component in the first metal layer is greater than two.

39. (original) The interconnect of claim 37, wherein the atomic ratio of the first metal component to the second metal component in the first metal layer is greater than ten.

40. (original) The interconnect of claim 37, wherein the atomic ratio of the first metal component to the second metal component in the first metal layer is greater than twenty.

41. (currently amended) A portion of an integrated circuit device, comprising:

a dielectric layer on a base layer;

a titanium nitride layer overlying the dielectric layer;

a ~~nitrided metal~~ layer of a metal alloy nitride on the titanium nitride layer, wherein the ~~nitrided metal~~ layer of metal alloy nitride comprises copper, a metal component ~~capable of~~ that can form~~ing~~ a crystalline compound with the copper, and nitrogen, wherein the metal component is selected from the group consisting of scandium, yttrium, lanthanum, titanium, zirconium and hafnium, and wherein an atomic ratio of copper to the metal component in the ~~nitrided metal~~ layer of metal alloy nitride is greater than one; and

a copper layer on the ~~nitrided metal~~ layer of metal alloy nitride.

42. (original) The portion of an integrated circuit device of claim 41, wherein a portion of the titanium nitride layer is adjoining a portion of the base layer.

43. (original) A portion of an integrated circuit device, comprising:

a layer of titanium nitride;

a nitrided metal layer on the layer of titanium nitride, wherein the nitrided metal layer is of the form MT_xN_y, where M is a first metal component, T is a Group IIIA or Group IVA transition metal, N is nitrogen, x is an atomic fraction of T, y is an atomic fraction of N, and x and y are each less than one; and

a metal layer on the nitrided metal layer, wherein the metal layer comprises the first metal component.

44. (original) The portion of an integrated circuit device of claim 43, wherein M is selected from the group consisting of copper, silver, gold, palladium, platinum, rhenium, iridium, ruthenium and osmium.

45. (original) The portion of an integrated circuit device of claim 43, wherein T is selected from the group consisting of scandium, yttrium, lanthanum, titanium, zirconium and hafnium.

46. (original) A portion of an integrated circuit device, comprising:

a layer of titanium nitride;

a nitrided metal layer on the layer of titanium nitride, wherein the nitrided metal layer is of the form MT_xN_y, where M is a first metal component, T is a Group IIIA or Group IVA transition metal, N is nitrogen, x is an atomic fraction of T, y is an atomic fraction of N, x is less than approximately 0.1 and y is less than approximately 0.9; and

a metal layer on the nitrided metal layer, wherein the metal layer comprises the first metal component.

47. (original) A portion of an integrated circuit device, comprising:

a layer of titanium nitride;

a nitrided metal layer on the layer of titanium nitride, wherein the nitrided metal layer is of the form CuT_xN_y, where Cu is copper, T is a Group IIIA or Group IVA

transition metal, N is nitrogen, x is an atomic fraction of T, y is an atomic fraction of N, and x and y are each less than one; and

a metal layer on the nitrided metal layer, wherein the metal layer comprises copper.

48. (original) The portion of an integrated circuit device of claim 47, wherein T is selected from the group consisting of scandium, yttrium, lanthanum, titanium, zirconium and hafnium.

49. (original) A portion of an integrated circuit device, comprising:

a dielectric layer on a base layer;

a titanium nitride layer overlying the dielectric layer;

a nitrided metal layer on the titanium nitride layer, wherein the nitrided metal layer comprises silver, a metal component capable of forming a crystalline compound with the silver, and nitrogen, wherein the metal component is selected from the group consisting of scandium, yttrium and lanthanum, and wherein an atomic ratio of silver to the metal component in the nitrided metal layer is greater than one; and

a silver layer on the nitrided metal layer.

50. (original) The portion of an integrated circuit device of claim 49, wherein a portion of the titanium nitride layer is adjoining a portion of the base layer.

51. (original) A portion of an integrated circuit device, comprising:

a titanium nitride layer;

a nitrided metal layer on the titanium nitride layer, wherein the nitrided metal layer comprises silver, a metal component capable of forming a crystalline compound

with the silver, and nitrogen, wherein the metal component is selected from the group consisting of scandium, yttrium and lanthanum, and wherein an atomic ratio of silver to the metal component in the nitrided metal layer is greater than one; and

a silver layer on the nitrided metal layer.

52. (original) A portion of an integrated circuit device, comprising:

a layer of titanium nitride;

a nitrided metal layer on the layer of titanium nitride, wherein the nitrided metal layer is of the form AgT_xN_y, where Ag is silver, T is a Group IIIA transition metal, N is nitrogen, x is an atomic fraction of T, y is an atomic fraction of N, and x and y are each less than one; and

a metal layer on the nitrided metal layer, wherein the metal layer comprises silver.

53. (original) The portion of an integrated circuit device of claim 52, wherein T is selected from the group consisting of scandium, yttrium and lanthanum.

54. (original) A portion of an integrated circuit device, comprising:

a layer of titanium nitride;

a nitrided metal layer on the layer of titanium nitride, wherein the nitrided metal layer is of the form AgT_xN_y, where is silver, T is a Group IIIA transition metal, N is nitrogen, x is an atomic fraction of T, y is an atomic fraction of N, x is less than approximately 0.1 and y is less than approximately 0.9; and

a silver layer on the nitrided metal layer.